Adapting Clinical Coding Systems for the Computer-Based Patient Record

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Background. Kaiser Permanente, Northwest Division, has deployed a comprehensive outpatient computer-based patient record system (CBPR). Physicians use this system to enter encounter notes, code diagnoses and procedures, maintain problem lists, transmit laboratory and radiology orders, send prescriptions electronically, and to transmit messages and referrals between providers.[1] Modifications to ICD9 were necessary to make diagnosis coding acceptable to clinicians. As of March 1997, over four million clinician-coded diagnoses, using our modified ICD9 coding system, have been entered into this system. Similar modifications to SNOMED will likely be needed to optimize it for use in a CBPR.

Adapting ICD9 for the CBPR. Early in our implementation of the CBPR, it became clear that use of the full and unmodified ICD9 vocabulary, for outpatient diagnosis coding, was problematic. This was because of the existence, in ICD9, of: Archaic terminology, "compound terms" (e.g.: Hypertensive heart *and* renal disease *without* CHF *or* renal failure), too many term matches for a given key-word, coders verbiage (such as the term-extensions NOS and NEC), lack of specificity, and inability to capture the clinician's exact intent.

Through various mechanisms, we were able to eliminate 8,000 of the 12,000 ICD9 terms because the terms were too obscure, synonymous with other terms, or "compound terms" (i.e. could be coded through the use of other more atomic terms).

In some cases the diagnosis in ICD9 was broad and insufficiently specific (e.g. 782.0 Disturbance of Skin Sensation). For those terms it was necessary to add "sub-codes" through the use of A and B extensions (e.g. 782.0A: Numbness and 782.0B:Tingling). We added back about 300 such "sub-codes", ending up with about 4,300 distinct ICD9 codes.

This decrease in number of codes essentially eliminated our problem of "too many matches" when searching for a diagnosis code.

In some cases, the ICD9 term found by the system was appropriate, but did not exactly match the clinician's intent. We added a "verbatim" utility that allowed the clinician to modify the textual description to suit the exact need. For instance "NIDDM" could be modified to "NIDDM, well-controlled". This allowed the system to capture the appropriate code *and* describe the diagnosis in sufficient detail to satisfy the needs of the clinician. Further details of our modifications to ICD9 are described in another article.[2]

Issues in adapting SNOMED to the CBPR. Although SNOMED is clearly more "granular" than other medical classifications such as ICD9,[3] increasing the granularity of a coding system increases ambiguity and may decrease accuracy and reproducibility.[4] This problem may be exacerbated when such a coding system is used in real-time by clinicians to enter diagnoses into a CBPR. It is likely that a similar process to that described above, in our adaptation of ICD9 to the CBPR, will be necessary to adapt SNOMED for use in a CBPR.

The use of a "verbatim" utility, that allows the clinician to add further details to an appropriate code, is a simple technique that will also improve clinician acceptance of a coding system in the CBPR.[5]

References

1. Chin HL, Krall MA. Implementation of a Comprehensive Computer-Based Patient Record System in Kaiser Permanente's Northwest Region. MD Computing. 1997: 14(1):41-5.
2. Krall MA, Chin HL, Dworkin L, Gabriel K, Hayami D, Towery B, Wong R. Improving the Acceptance and Performance of Clinicians in the Diagnostic Coding Task Required by an Outpatient Computer Based Medical Record. Am J Managed Care. 1997: 3(4):597-601.
3. Chute CG, Cohn SP, Campbell KE, Oliver DE, Campbell JR. The Content Coverage of Clinical Classifications. For The Computer-Based Patient Record Institute's Work Group on Codes and Structures. J Am Med Inform Assoc. 1996: 3(3):224-33.
4. Klimczak JC, Hahn AW, Sievert ME, Petroski G, Hewett J. Comparing Clinical Vocabularies Using Coding System Fidelity. Proc Annu Sump Comput Appl Med Care. 1995: 883-7.
5. Scherpbier HJ, Abrams RS, Roth DH, Hail JJ. A Simple Approach to Physician Entry of Patient Problem List. Proc Annu Symp Comput Appl Med Care 1994: 206-10.

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